

OPERATION OF THE PHENIX-MUID QA HV SYSTEM IN BUILDING 905

Text Pages 1 through 3
Attachment(s) 1

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REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	CURRENT OVERSIGHT
A	First Issue	4/7/1998	n/a	K. Read, W. McCabe, A. Etkin	n/a
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1.0 Purpose and Scope

This procedure provides instruction for starting up and shutting down of the high voltage system in the PHENIX-MUID tube quality assurance (QA) area in Building 905. It specifies which procedure can or can not be performed in unattended mode. It does not describe the operation of the HV control and the data acquisition programs used for the tube QA.

2.0 Responsibilities

- 2.1 Operator is responsible for conducting the procedures and logging of the gas and the high voltage operation.

3.0 Prerequisites

- 3.1 Operator shall have completed BNL compressed gas and electric safety training.
- 3.2 Operator shall be designated as being cognizant of proper operating practices by the technical supervisor.
- 3.3 Only pre-qualified MUID tubes shall be used in this procedure.

4.0 Precautions

- 4.1 All of the high voltage supplies shall be turned off prior to entering the QA area with the sole exception of the circumstances and use of the procedure described in section 5.4 below.
- 4.2 All test tubes shall be connected by ground return connectors and attached electrically to the base plate of the stack of tubes (QA shelf).

5.0 Procedure

- 5.1 Apply High Voltage for Tube Conditioning

Note: Tubes shall be under HV for 5 full days. Unattended mode shall be allowed for this procedure.

- 5.1.1 Operator shall turn off the main power of the HV.

Warning: There are 5 HV distribution racks and they are all under HV under normal operation mode. All HV channels shall be turned off by HV control program running on a computer, then the main power of the HV crate shall be turned off by the key before entering the QA area to perform this procedure. "High Voltage" sign shall be turned off at this time.

- 5.1.2 Operator shall connect high voltage connectors (known as Bindi connector) of the HV distribution rack to the MuID tubes stacked on a shelf in the QA area.
 - 5.1.3 Operator shall perform the CO₂ gas leak test according to the procedure "Operation of the PHENIX-MuID QA Gas System in Building 905."
 - 5.1.4 Operator shall commence CO₂ gas flow according to the procedure "Operation of the PHENIX-MuID QA Gas System in Building 905."
 - 5.1.5 Operator shall replace the protective aluminum endcovers to enclose all the tube endcaps at both ends of the tubes.

- 5.1.6 Operator shall verify no one else is in the QA area.
- 5.1.7 Operator shall exit the QA area and close the barricade door.
- 5.1.8 Operator shall turn on the main power of the HV supply with all HV channels set to 0 V.
- 5.1.9 Operator shall verify that the "High Voltage" sign is on.
- 5.1.10 The HV distribution rack is equipped with Ne lamps which serve as a current monitor. Operator shall bring up the selected set of HV channels (6 channels in total) to 100 V. Short circuit in the tubes shall be detected by illuminated Ne lamp.
- 5.1.11 If illuminated Ne lamps are observed from outside of the QA area, operator shall write down the channel numbers.
 - 5.1.11.1 Operator shall perform step 5.3 to shut down the high voltage.
 - 5.1.11.2 Operator shall enter the area and disconnect the corresponding tubes.
 - 5.1.11.3 Operator shall mate the Bindi connectors just disconnected with empty Bindi connectors to avoid any HV exposure.
 - 5.1.11.4 Operator shall close the QA area and follow steps 5.1.8 through 5.1.10 to turn on the HV.
 - 5.1.11.5 Operator shall verify that no Ne lamp is illuminated.
- 5.1.12 Operator shall bring up the HV supply to the operating voltage (nominally 4500V) for all channels used for tube conditioning.
- 5.2 Apply High Voltage for Tube Efficiency Measurement
 - 5.2.1 Operator shall turn off the main power of the HV.
 - 5.2.2 Operator shall verify that "High Voltage" sign is off.
 - 5.2.3 Operator shall disconnect all Bindi connectors from the selected set of tubes.
 - 5.2.4 Operator shall connect the preamplifier box to the stack of tubes just disconnected from the HV distribution rack.
 - 5.2.5 Operator shall verify the low voltage supplies are all on.
 - 5.2.6 Operator shall replace the protective aluminum endcovers to enclose all the tube endcaps at both ends of the tubes.
 - 5.2.7 Operator shall exit and power on the HV supply following the procedure 5.1.6-5.1.12.
 - 5.2.8 Maximum number of channels which can be measured shall be 80. The same procedure 5.2.1-5.2.7 is to be repeated for the rest of the tubes in the stack.
- 5.3 Shut Down High Voltage
 - 5.3.1 Operator shall bring down HV for all channels to zero.
 - 5.3.2 Operator shall turn off the HV power supply.
 - 5.3.3 Operator shall turn off the "High Voltage" sign.
- 5.4 Entering the QA area with High Voltage Remaining On

Note: Only specifically authorized personnel who have read, acknowledged, and signed the "Procedure to work inside the PHENIX MuID QA area in Building 905 with HV on" form in addition to satisfying the prerequisites in section 3 above are permitted to perform this procedure. This procedure allows the operator to work on tubes not under high voltage for the purposes of rearranging connectors, tubing, and doing gas tightness tests. High voltage is not to remain on for changing gas bottles.

5.4.1 Operator shall shutdown the main power of the HV according to section 5.3 above.

5.4.2 Operator shall insert a shorting device in the HV supply cable to the HV distribution rack(s) for the tubes which are being serviced. This shall short both the supply output and the load.

5.4.3 Operator shall replace the protective aluminum endcovers to enclose all the tube endcaps at both ends of all stacks of tubes not being serviced.

5.4.4 Operator shall exit the QA area and notify coworkers around the outside of the QA area that he/she intends to start working in the area with HV on. No one shall change the HV state (enable/disable) until the work is done.

5.4.5 Operator shall set all the HV channels which supply HV to the test tubes to be serviced to 0 V.

5.4.6 Operator shall turn on the supplies for those tubes not being serviced but under conditioning according to the procedure described in 5.1.9-5.1.12 above or under efficiency measurement according to the procedure described in 5.2.7-5.2.8.

5.4.7 Operator shall re-enter the QA area and shut the barricade door behind.

5.4.8 Operator shall work on the stack of tubes to be serviced.

5.4.9 Operator shall exit the QA area once the tubes have been serviced.

6.0 Documentation

6.1 Documentation shall be kept in the System Operator's Logbook in Building 905.

7.0 References

7.1 All the PHENIX MUID construction procedure documents can be found through PHENIX MUID Factory WEB page <http://riksg01.rhic.bnl.gov/muid/>. A hardcopy of those documents are also kept in the specific work areas in building 905.

8.0 Attachment

1, MUID QA HV system diagram

MuID Factory HV Distribution

Notes:

1. During normal operation there is no voltage drop across the per-channel resistors or neon lamp since the Jarrocci tubes are an open circuit.
2. If a tube should short (broken wire) the supply's maximum current output limits the voltage drop to 85 V.
3. All components at HV are isolated from ground on their own perf board.
4. Total stored energy is 0.9 J. The bleeder resistor will discharge capacitors in one minute.

